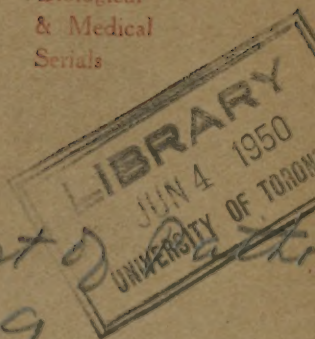


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Considerable interest has of late been evinced in certain diseases which have been found to be due to various forms of moulds. The pathogenicity of fungi, apart altogether from the innumerable varieties of bacteria, such as the actinomyces, the organism of Madura Foot, and the streptothrix, has for years been well-recognized, and we are beginning to realize with increasing force that other forms which have ordinarily been regarded as harmless can on occasion give rise to disease processes. Among these may be instanced the aspergillus which is the cause of pneumonomycosis, a disease closely resembling chronic tuberculosis. It causes also a form of otitis, and has been discovered by an Italian observer in pellagra. It is somewhat remarkable, considering the great abundance of such moulds in nature, that they should so rarely cause trouble, and in fact some controversy has taken place as to whether aspergilli when present in disease processes should be regarded as true parasites or merely as accidental saprophytes. It can, however, hardly be denied in view of recent experimental work that the aspergilli are pathogenic, at least for the ordinary laboratory animals, and by inference for man, and it can only be that their pathogenicity is of a low grade, or that it can be evinced only under a peculiarly fortunate or unfortunate concurrence of circumstances.

The occurrence of moulds in the external auditory meatus was recognized by Mayer as far back as 1844, but we are indebted for more exact knowledge to the classic researches of Schwartze and Wreden. The form most commonly found is the aspergillus, of which about sixty instances are on record, mostly in Germany and the United States. The disease Otomycosis, or, as it was somewhat more precisely called by Wreden, Myrinomycosis Aspergillina, is decidedly rare in Canada. Buller (²⁹) states that he has met with only one case, and that due to the aspergillus niger, in about thirty-five hundred patients in the Province of Quebec, and only two cases have been reported to this Society, one

by Dr. G. H. Mathewson (²⁸), and the other by one of us (H. S. B.) (²⁷). Both of these were also of the niger variety. The disease is now sufficiently well recognized by otologists everywhere, although certain minor points as to differentiation of the species of moulds at work remain to be worked out. We are lead to place the present case on record, not from anything peculiar or new in the disease as such, but to draw attention to an example of an excessively rare form of infection.

CLINICAL HISTORY by Dr. Birkett.—The patient was a man about 40 years old, and he consulted me on account of an impairment of his hearing, which had been present for nearly three months. The condition has been treated by syringing on the presumption that the deafness was due to an accumulation of wax, but it did not improve, and when I saw the man his hearing was limited to detecting the sound of a watch when it was held in contact with the ear. The patient also complained of an intense itching and a stinging pain in the ear.

Upon examination I found the ear filled with a dark mass, which at first sight resembled desquamating epithelium, but upon closer inspection with a lens, the surface appeared to be covered with a greenish material, which presented all the characteristics of a mould. This impression was confirmed when I removed the mass and examined it more closely.

The case, then, was definitely one of mycotic infection, but it was not apparent at the time which form it was. The treatment was obvious, the instillation into the ear of alcohol and boracic acid at intervals during three months. At the end of that time the growth was destroyed, and the hearing was restored to about half the normal acuteness. At the time the growth was thought to be an *Aspergillus*.

Moulds in the ear are not uncommon, but the *A. glaucus* variety is very rare. Many of these cases are treated as if they were merely due to an accumulation of wax, and too often they are treated by the injection of water, which does not improve matters as moisture is favourable to continued growth. In addition to this there is usually an eczematous condition present in the auditory canal which makes the habitat still more favourable for plant life.

A portion of the material removed, which had the appearance of dried secretion covered with a dull greyish-green fur, was inseedinated on agar and potato. On agar in twenty-four hours was produced a mould together with a moist whitish scum of a different nature. The latter was proved subsequently to be a growth of the *staphylococcus albus*. On potato the growth of the mould was much more luxuriant

than on agar. From the potato culture pure growths were obtained which were inseeded on broth, agar, potato, and gelatine plates. The resulting growth was most abundant on potato and gelatine, less so on broth and agar. The mould grew well both at the room and incubator temperatures. Under the microscope it was found to belong clearly to the aspergillus group and presented the following characteristics. It possessed the usual branching mycelium. The hyphæ were relatively short, faintly granular, practically devoid of pigment, and exhibited slight fusiform enlargements. The receptaculum was flask- or club-shaped. The sterigmata were undivided and placed on the distal two-thirds of the receptaculum. The spores were round or slightly ovate and of a distinct pale greenish tint. As compared with the *A. niger*, the main differences in the organism under discussion were that the receptaculum was much smaller, less fully fruited, the hyphæ shorter, and the pigment green instead of black.

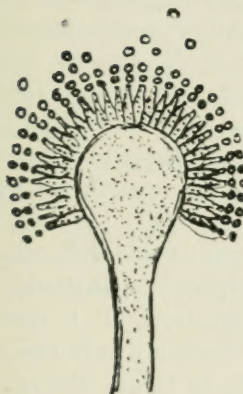


FIG. 1. Diagrammatic section through the centre of the conidiophore of the *Aspergillus glaucus*.

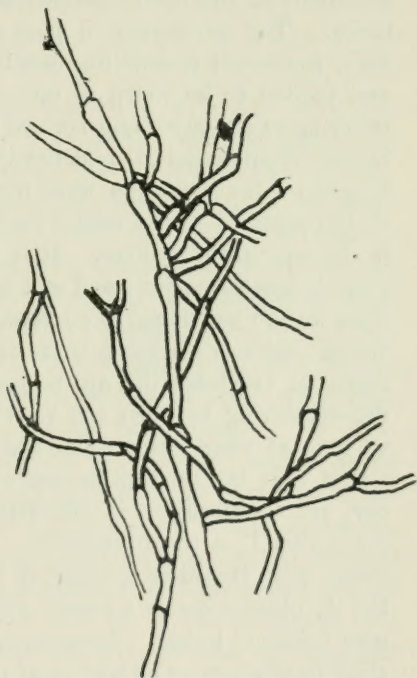


FIG. 2. Idealized view of the mycelium of an *Aspergillus*. (Thoma.)

An emulsion was made of the mould in physiological salt solution and one and a half ccm. of this injected with antiseptic precautions into the auricular vein of a rabbit. The animal died in three days.

The animal was sectioned shortly after death, and the lungs, liver,

and kidneys were found to be thickly studded with what resembled small abscesses or minute areas of necrosis, the size of a pin-head and surrounded by a zone of hyperæmia. Small portions of the liver and kidney, removed with the usual precautions, were placed in agar tubes and subjected to the incubator temperature. In two days there was an abundant growth of a mould of dark greyish-brown colour. When transferred to potato the original, characteristic, dull greenish pigment was produced. Microscopically, the mould presented all the peculiarities of the original form inoculated. Portions of the liver, lungs, spleen, and kidneys were mounted in celloidin and stained with hæmatoxylin-cosin, lithion-carmin, and carbol-thionin. The best results were obtained with the last-mentioned stain. The fungi were observed in all the organs save the spleen. The small dots seen in the various organs consisted of masses of mycelium together with a few mononuclear and polymorphonuclear leucocytes. The mould was particularly abundant in the larger vessels, but had extended even into the capillaries. The mycelium in places presented the appearance of short rods, somewhat resembling bacilli, except that they were much larger and tended to be sharp at one end while clubbed at the other. In other cases the mycelium formed long, simple or richly branching filaments. Small areas of condensation in the protoplasm could frequently be seen. No sporangia were noted. In view of the peculiar colour of the pigment in the mould just described we have concluded that it is the *aspergillus glaucus*. It is true that it has been stated that this form is non-pathogenic and will not grow at the incubator temperature. This we are convinced is an error. So far as we can gather from the various authorities there is, as is usually the case when the humbler forms of vegetable life are under discussion, considerable difficulty in differentiating between the various forms of *aspergillus*, inasmuch as all may at times show some aberration from the type. It is usually stated that the *aspergillus niger* is the form commonly found in the ear, yet Steinbrugge, in the article on the Ear in Orth's Pathology, holds that it is the *fumigatus*. This discrepancy of opinion probably arises from insufficient study of the forms mentioned, for occasionally the *A. niger* presents a smoky appearance, and again the *A. fumigatus* may become blacker. Apparently a difference of environment is sufficient to produce an alteration of the pigment, for it will be remembered that in our case the mould as recovered from the rabbit into which it had been inoculated and grown on agar presented a somewhat brownish colour, which was subsequently on a different medium transformed into a dull, glaucous green. Similar considerations have led some to regard the *A. flavus* and the *A. fumigatus* as sub-varieties of the *A. glaucus*. With regard to pathogenicity, we need only say that the *A.*

niger and the *A. fumigatus* have been the forms usually studied, while but little seems to have been done in the case of the *A. glaucus*. So far as our present knowledge goes, we can only distinguish between the various forms on the basis of the colour of the pigment, the size of the receptaculum, the length of the hyphæ, and, possibly, slight differences in pathogenicity. As compared with the *A. niger*, the form we have here described possessed much shorter hyphæ, the receptaculum was smaller and more flask-shaped, and the pigment was a dull greyish-green. As Moos ⁽⁷⁾ has pointed out in the case of the *A. fumigatus*, clinical symptoms may be absent or trifling, indicating a low grade of virulence. At other times the condition is troublesome and persistent.

Not having access to the complete literature on the subject of otomycosis we are unable to state positively in how many of the recorded cases the *A. glaucus* has been found, but undoubtedly it is excessively rare. Wreden, Siebenmann, Hassenstein, and Burnett all mention the *A. glaucus* as occurring. Hassenstein's patient was a man forty-five years of age, who had for five or six years suffered from nasal catarrh and deafness. He had had a malodorous discharge from the right ear for three years, but no pain or tinnitus. The auditory canal was reddened and swollen. The symptoms lasted ten days after treatment was inaugurated. On the walls of the meatus and on the membrane was a yellowish green deposit. An examination of this by Hallier revealed several forms, the *A. glaucus*, stemphylium, and the graphium pencilloides. Burnett's patient was a man thirty-five years old, who had for some weeks suffered from deafness, pain and itching of the left ear and a watery discharge. A few days later the right ear became involved. Examination showed in both a pale grey membrane covering the upper part of the canal and the membrana.

The essential conditions for the growth of aspergilli appear to be warmth and moisture. Thus it is that the mould usually affects the external auditory meatus or the lungs. It is rare to find it elsewhere. Draper, of New York, once observed the *A. niger* growing on the skin on the inner side of the thigh, and it is interesting that in this patient the organism subsequently appeared in the ear. The fungus is also known to invade the interstices of the bones in the case of dogs and fowls, and an epidemic of this disease has been noted among the birds in one of the zoological gardens. Attempts to cultivate the mould in the normal ear have failed, so that it would seem that some pathological condition must previously be existent which provides the necessary factors. The presence of normal wax or of a purulent discharge do not favour the growth. Maceration and loosening of the superficial epithelium, with the production of a neutral or slightly acid medium,

such as is produced by dermatitis, eczema, or psoriasis, so-called, provide the most favourable conditions. The site of election in the ear is perhaps best explained in that the essential factors are here provided and in view of the common practice of instilling oil or other foreign substances, which are apt to contain the spores, into the ear. The mycelium grows in the rete malpighii and gradually penetrates the deeper structures. The hyphæ can be seen projecting into the cavity. In consequence of the fungus reaching the sensitive parts, or possibly from some toxin, irritation is produced. There is a sense of fulness or actual pain in the ear, tinnitus and itching of the meatus. Vertigo is rare, but the hearing may be considerably impaired. On examination patches of a membranous character may be noted on the walls of the canal or even on the membrana, presenting a colouration varying according to the nature of the fungus at work. In several cases, the fungus has extended to the middle ear, and in two was apparently the cause of perforation (Pollitzer, Bezold). Diagnosis is readily made with the microscope.

The usual treatment consists in mechanical removal of the plugs, and the topical application of some parasiticide, of which nearly all have at some time or other been advocated. Perhaps the best is rectified spirits, either alone or with boracic acid (1-20), or salicylic acid (2 per cent.). The disease is, as a rule, readily amenable to this procedure.

In conclusion, we desire to express our thanks to Dr. F. M. Fry, who kindly undertook to look up certain references not accessible to us.

BIBLIOGRAPHY OF OTOMYCOSIS.

1. Mayer—Müller's Archiv., 1844, S. 410.
2. Pacini—Una muffa parassita nel condotto auditivo esterno. Firenze, p. 7.
3. Cramer—Vierteljahrsch. d. Naturforscherges. in Zurich, 1859.
4. Schwartze—Arch. f. Ohrenheilkunde., Bd. II., Heft 1, 1867.
5. Wreden—Arch. f. Ohrenheilk., Bd. III. Heft I.
6. Siebenmann—Zeitscher. f. Ohrenheilk. XII, S. 124, 1882-3.
7. Moos—Profuse aber vollständ. symptomlose Aspergillusbild. im äuss. Gehörg. Bd. II., Abt. II., S. 160.
8. Greene—Trans. Amer. Otol. Soc., 1869, I., p. 79.
9. Blake—Trans. Amer. Otol. Soc., 1871.
10. Knopf (quoted by Roosa).
11. Roosa—Amer. Journ. Med. Scien., Jan., 1870.
12. Burnet—Philadelphia Med. Times, VIII., 435, 1887-8: Arch. of Otol., Vol. X, p. 319: Amer. Journ. of Otol., 1879, I, 93: Med. and Surg. Reporter, 1889, LXI., 539.
13. Hassenstein—Arch. f. Ohrenheilk., Bd. IV., S. 164.
14. Steudener—Arch. f. Ohrenheilk., Bd. V., S. 163 (tricotheceum roseum): also Hungar. Med. Chir. Presse, 1868-9 S. 12, 16, 19, (mucor mucedo).
15. Troeltsch—Die Myringomycosis (ascophora elegans). S. 44.
16. Wreden—Arch. f. Ophthal. u. Otol., Bd. VI., No. I, S. 87, (otomyces purpureus).

17. Bezold—Votr. im ärztl. Verein Münchens. 1880.
18. Theobald—Amer. Journ. Otol., III., 119, 1881.
19. Rankin—Pittsburg Med. Journ., II., 103, 1882.
20. Von Gohren—New Orleans Med. and Surg. Journ., 1882-3, n. s. X., 607.
21. Wagenhäuser—Befund d. *Mucor corymbifer*. Arch. f. Ohrenheilk., Bd. XXI., S. 270.
22. Vallentin—Ein Fall von Soor d. Mittelohres. Arch. f. Ohrenheilk., Bd. XXVI., S. 81.
23. Lindt—Ueber einen neuen pathogenen Schimmelpilz aus d. menschl. Gehörg. Arch. f. Exper. Pathol. u. Pharm. Bd. XXV., S. 257. (*eurotium malignum*).
24. Pollitzer—Die parasitäre Entzünd. d. äuss. Gehörg., Wiener med. Woch., 1882, No. 29.
25. Kirchner—Pityriasis versicolor im äuss. Gehörg. Monatschr. f. Ohrenheilk., 1885, No. 3.
26. Bishop—Charlotte Med. Journ 1895, VII., 145.
27. Birkett—Montreal Med. Journ., Vol. XXX., p. 382.
28. Mathewson—Montreal Med. Journ., Vol. XXXII., p. 280.
29. Buller—Reference Handbk. Med. Scien. Vol. III., p. 616, 2nd. edit.



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